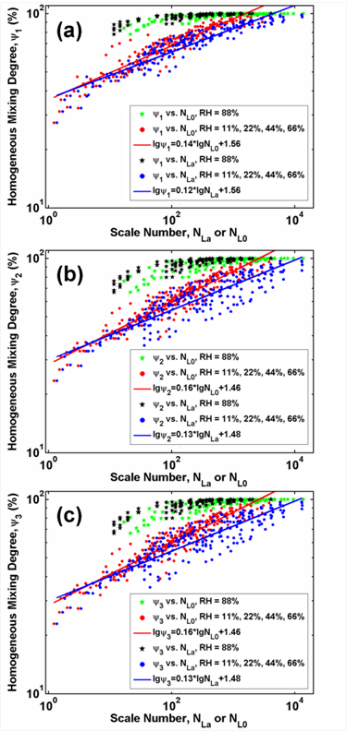
Exploring Parameterization for Turbulent Entrainment-Mixing Processes in Clouds

Research Highlight

Different turbulent entrainment-mixing processes (e.g., homogeneous and inhomogeneous) in clouds give rise to distinct cloud properties, and thus accurate representation of these processes is critical for improving in large scale-models; however, scientists still lack such a parameterization that spans the spectrum of entrainment-mixing processes. Department of Energy scientists at Brookhaven National Laboratory and collaborators tried to fill this gap using in situ aircraft measurements collected by the DOE's Atmospheric Radiation Measurement Climate Research Facility's Southern Great Plains site and numerical simulations with the Explicit Mixing Parcel Model (EMPM).

The relationships are established between degree of homogeneous mixing (newly defined) and transition scale numbers (measures of entrainment-mixing dynamics).

Based on the relationships, a parameterization of the entrainment-mixing processes is advanced.



Relationships between the three microphysical measures of homogeneous mixing degree (#1, #2, #3) and the two transition scale numbers (NLa, NL0), respectively. The results shown here are from the EMPM simulations.

Reference(s)

Lu C, S Niu, S Krueger, and T Wagner. 2013. "Exploring parameterization for turbulent entrainment-mixing processes in clouds." Journal of Geophysical Research – Atmospheres, 118, doi:10.1029/2012JD018464.

Contributors

Yangang Liu, *Brookhaven National Laboratory*; Chunsong Lu, *Brookhaven National Laboratory*

Working Group(s)

Cloud Life Cycle, Cloud-Aerosol-Precipitation Interactions